

# **SECURITY**

---

# **MARKING**

**The classified or limited status of this report applies to each page, unless otherwise marked.**  
**Separate page printouts MUST be marked accordingly.**

---

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C., SECTIONS 793 AND 794. THE TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

ARMY CONCEPT TEAM IN VIETNAM  
APO San Francisco 96243

473407

LETTER REPORT

UH-1 HELICOPTER SHELTERS

DDC

NOV 9 1965

8

**Best  
Available  
Copy**

JRATA (1 Oct 65)

1st Ind

SUBJECT: Letter Report of Evaluation - UH-1 Helicopter Shelters  
(IA-109.0)

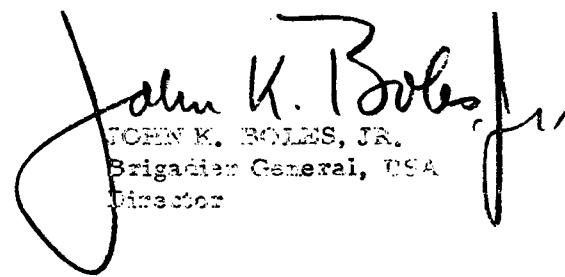
Joint Research and Test Activity, APO San Francisco 96309, 1 October 1965

TO: See Distribution Basic Letter

1. The UH-1 Helicopter Shelter, which was developed by the U. S. Army Limited War Laboratory, was evaluated at the request of U. S. Army Support Command, Vietnam. The requirement for an air transportable aircraft maintenance shelter will be amplified with increasing air mobile operations in Vietnam. As the shelter evaluated did not satisfy this requirement, alternative approaches should be explored to provide the desired capability.

2. While the concept of an open sided shelter might be suitable for the present counterinsurgency environment, consideration should be given to the possible requirement for aircraft maintenance in forward combat areas under blackout conditions at night in the event of an increased scale of warfare in tropical areas.

3. I concur in the findings and recommendations contained in this report.

  
JOHN K. BOLES, JR.  
Brigadier General, USA  
Director

ARMY CONCEPT TEAM IN VIETNAM  
APO San Francisco 96243

ACTIV-CH

1 October 1965

SUBJECT: Letter Report of Evaluation - UH-1 Helicopter Shelters (IA-109.0)

TO: See Distribution

1. REFERENCES

- a. Letter, USASCV-ASCV-D, subject: UH-1 Helicopter Shelters, 12 October 1964.
- b. Letter, USACDC-SWCAM, subject: UH-1 Helicopter Shelters, 20 October 1964.
- c. Letter, ACTIV, subject: Maintenance Shelters for UH-1 Series Helicopters, 9 June 1964.

2. AUTHORITY

Letter, JRATA 4567, 28 October 1964, Project Proposal - UH-1 Maintenance Shelters.

3. PURPOSE

The purpose of the evaluation was to determine the suitability of the shelter, utility, tropical, developed by the United States Army Limited War Laboratory (USALWL) for use in the counterinsurgency environment of Vietnam as a UH-1 helicopter maintenance shelter.

4. BACKGROUND

The UH-1 helicopter was used extensively in all areas of South Vietnam in counterinsurgency operations. Frequently, units were required to operate away from their permanent base, and aircraft maintenance was conducted in the field without adequate maintenance shelters. This problem was aggravated during the rainy season.

In September 1963, the Army Concept Team in Vietnam (ACTIV) recommended to the Office, Chief Research and Development, Department of the Army, that a shelter proposed by the USALWL for the UH-1 series helicopter

be developed and tested. The shelter, utility, tropical, was developed by IWL in response to the requirement for an air transportable aircraft maintenance shelter for the UH-1 series helicopter. USAIWL advised that the shelters should be available for evaluation by 1 February 1964.

Because of the permanent hangar construction program and the static operational situation in March and April 1964, the requirement for air transportable maintenance shelters progressively decreased. Based upon a field survey conducted from 22 to 31 May 1964, ACTIV recommended to United States Army Combat Developments Command (USACDC) in reference 1c that the UH-1 maintenance shelters developed by USAIWL not be sent to Vietnam for evaluation and recommended that necessary service and troop testing be performed by appropriate test agencies. Reference 1c also noted that during the initial and follow-on build up phases of aviation units in Vietnam, an urgent requirement would exist for the shelters.

In October 1964, because of the arrival of new aviation units in Vietnam, the United States Army Support Command, Vietnam (USASCV) expressed a desire to Chief, ACTIV, to evaluate the shelter developed by USAIWL.

As a result ACTIV proposed an evaluation of the "UH-1 Helicopter Shelters" which was approved by the Joint Research and Test Activity (JRATA) on 28 October 1964, and USAIWL shipped two shelters, utility, tropical, to USASCV on 27 November 1964. On 13 January 1965, USASCV advised ACTIV that the shelters had arrived in Vietnam.

## 5. DESCRIPTION OF MATERIEL

The shelter, utility, tropical, is an "A" tent with a tropical fly positioned one foot or more above the tent. The tropical fly has wind spoilers around the edges to distribute wind load. The shelter is supported by four jointed aluminum poles, each having five sections. When the poles are assembled and mounted on the two base plates, they present a tetrahedral configuration. A series of web loops across the ridge and hip lines on the inside of the tent provide a means of suspending electric lights, should they be needed.

### a. Dimensions

The sides of the tent are 25 feet 8 inches long and the width, or door space, is 32 feet. The tent is 21 feet high at the ridge and the ridge of the fly is 22 feet high. The length of the ridge of the fly is 30 feet; when opened up its overall dimensions are 30 by 40 feet.

### b. Weight and Cubage

The tent weighs 98 pounds and the fly weighs 78 pounds. The poles weigh 304 pounds. Base plates, stakes, ropes and all other accessories weigh 99 pounds for a total weight of 579 pounds. The folded tent

and fly have a cube dimension of 11.4 cubic feet. The base plates, accessories and poles have a cube of 20.5 cubic feet.

#### 6. DATA COLLECTION

Data were collected by questionnaires, by discussions with personnel of using organizations, and by observing the use of the shelters. Evaluation procedures follow:

- a) Evaluators observed the initial erection of the shelter at Ban Me Thuot and its use at other locations.
- b) Discussions were held with aviation company and battalion commanders on the merits of the shelter.
- c) Discussions were held with aircraft mechanics on the conduct of aircraft maintenance in the shelter.

#### 7. DISCUSSION

Both shelters provided by USAIWL were used during the evaluation. Initially, on 13 January 1965, one shelter was issued to the 52nd Airlift Platoon (RW) for use at Ban Me Thuot and the second was issued to the 145th Airlift Platoon (RW) for use at Phan Thiet. On 26 March 1965 the shelter of the 52nd Airlift Platoon was transferred to the 197th Aviation Company at Tan Son Nhut Airfield in Saigon. On 1 June 1965 both shelters were issued to A Company, 1st Aviation Battalion for use at Ban Me Thuot.

On 14 January 1965 the 52nd Airlift Platoon erected the shelter at Ban Me Thuot Army Airfield in the central highlands of Vietnam. It was a clear, warm, windy day with gusts to 20 knots. The instructions for installation were read, explained, and followed. Because of the gusty wind it was found that 12 men were required to erect the shelter rather than the 6 called for in the installation instructions. In the red clay soil found in the central highlands, the tiedown pins supplied with the shelter were adequate. The shelter was erected as shown in figure 1 in the center of the airfield along the edge of the parking ramp.

In order to use the shelter it was necessary to install the ground handling wheels on the UH-1 to push the helicopter from the parking ramp into the shelter. A fine clay silt dust covered the entire airfield and whenever an airplane or helicopter took off or landed, a dust cloud formed and floated across the field into the shelter. Since it rained infrequently during the dry season and the temperature range was between 75 and 95 degrees Fahrenheit, most crew chiefs preferred to work in the open rather than going to the trouble of pushing the helicopter into a dusty shelter. Consequently, the shelter was not used.



FIGURE 1. Shelter, utility, tropical, Ban Me Thout Airfield, 4 January 1965.

The second shelter was originally scheduled for use at Phan Thiet Army Airfield by the 145th Airlift Platoon but the platoon was moved to Vung Tau until construction was completed at Phan Thiet. Vung Tau Airfield is adjacent to the South China Sea and the entire area consists of soft beach sand. The UH-1 helicopter on ground handing wheels was extremely difficult to move in the soft sand and a site was selected for the shelter adjacent to a pierced steel parking ramp. A work order was submitted requesting a pierced steel planking extension to be used as the floor of the shelter. Before work was begun, personnel of the 145th Airlift Platoon observed the shelter at Ban Me Thuot and decided that it would not be practical for use at Vung Tau. The shelter offered no protection from the blowing sand prevalent in that area and it was placed in storage. The 145th Airlift Platoon was given hangar space for its maintenance.

During the latter part of January and the first two weeks of February 1965, the ACTIV project officer discussed the shelter with aviation battalion and aviation company commanders and the executive officer of the 5th Special Forces Group. None expressed interest in the shelter and they all recommended that the shelters be stored until the rainy season.

On 16 February 1965 all personnel attending the USASCV Aircraft Maintenance Conference were briefed on the shelter and asked if they could use it. The 197th Aviation Company representative was the only person who expressed an interest. The shelter at Ban Me Thuot was struck and moved to the 197th Aviation Company flight line at Tan Son Nhut Airfield in Saigon on 26 March 1965 where it was erected adjacent to the pierced steel parking ramp on a graveled area as shown in figure 2. The shelter was set up on a windless day, but eight men were used because considerable difficulty was encountered with the screw-type tiedown pins in the gravel and rocky soil. The screw pins would not penetrate the gravel. Tiedown pins from an OLA airplane mooring kit were tried, but also failed to penetrate the rocky soil. Finally, it was found that the standard engineer barbed wire entanglement stake would penetrate the ground and prove satisfactory. During installation of the tent, the top section of one main pole bent (cause unknown) as shown in figure 3. Although the tent was available for 60 days, mechanics preferred to perform maintenance in the open, the shelter was not used, and it was struck on 31 May 1965.

On 1 June 1965 the two shelters were issued to the 165th Transportation Aircraft Maintenance Team KD in direct support of A Company, 1st Aviation Battalion. The first shelter was erected adjacent to the flight line at Ban Me Thuot Army Airfield on 2 June 1965. It had not been used when the ACTIV project officer visited the site on 9 June 1965. However, the maintenance officer anticipated using it during the rainy season from mid-June until mid-October. The second shelter was erected on 20 June 1965.

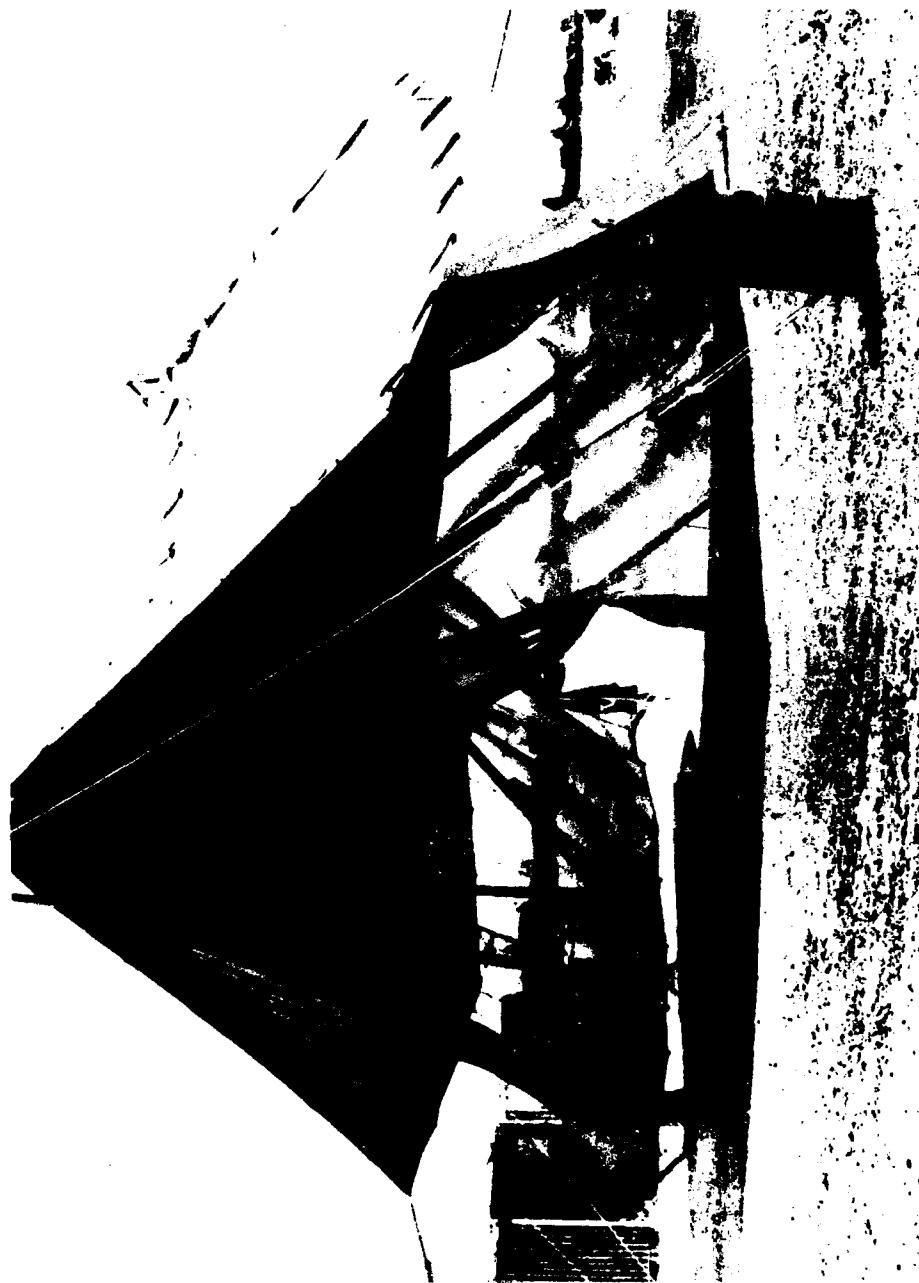


FIGURE 2. Shelter, utility, tropical, 197th Aviation Company, Tan Son Nhut Airfield, Saigon.

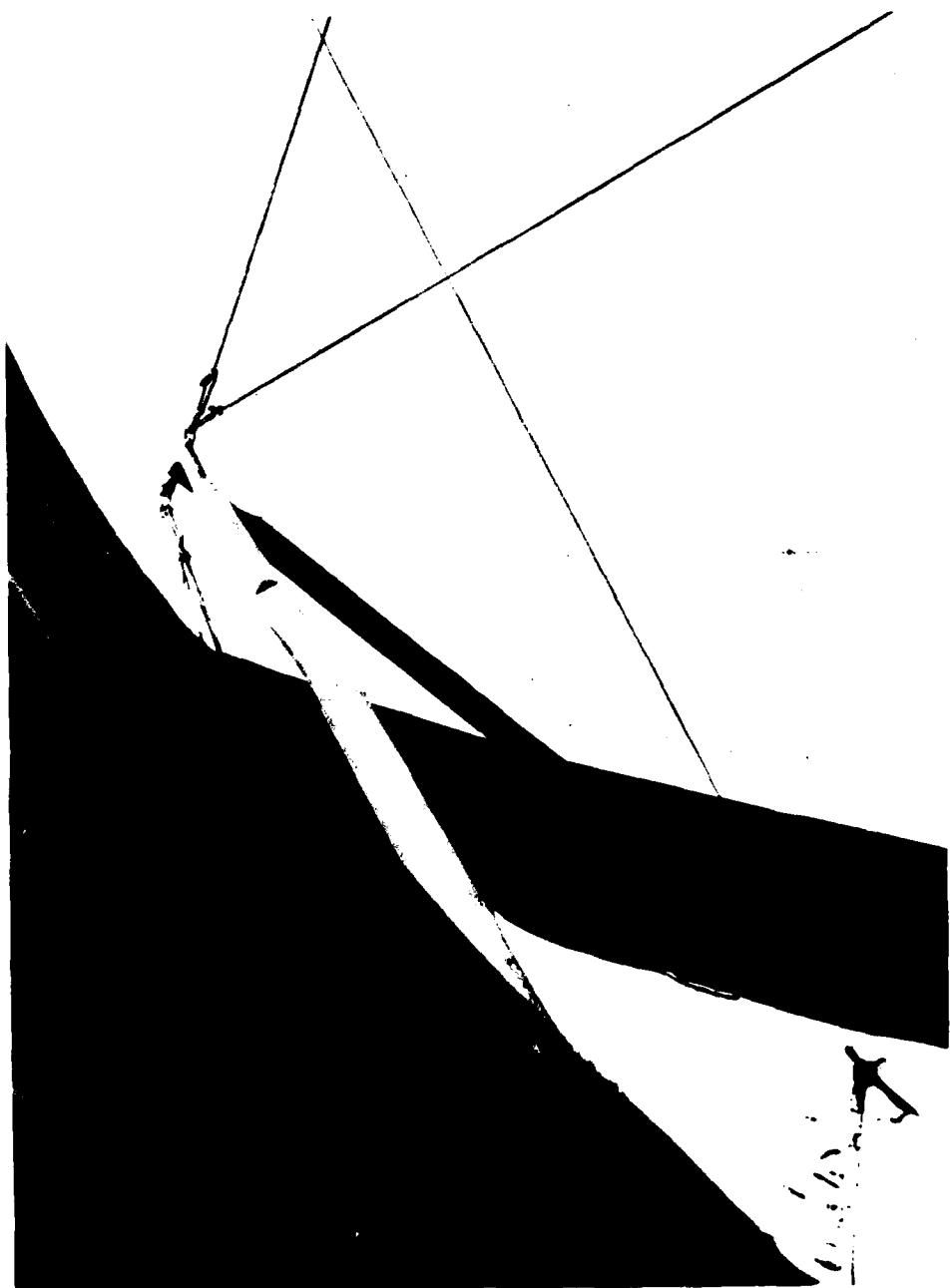


FIGURE 3. Top section of bent main pole.

During June, July, and August the project officer visited the site and found that both shelters were being used to conduct aircraft field maintenance during the frequent rain showers. As a result of discussions with maintenance personnel the following information was obtained:

- a) The shelter was too small. It should be large enough to house a complete aircraft and hoisting device to allow a complete inspection to be made before movement of the aircraft was required.
- b) The shelter did not provide protection from blowing dust, rain, or sand. End and side flaps were required to keep tools and equipment protected.
- c) The mosquito netting was effective and desirable but was not strong enough to withstand tearing of the seams when blasted by the downwash of helicopters.
- d) The shelter was cool and pleasant to work in during hot, humid weather.
- e) The majority of maintenance personnel felt that a light-weight, expandable maintenance shelter that could be enlarged to any required size by addition of building block units was preferable to a tent.
- f) The shelter was easy to erect or strike and could easily be loaded in a UH-1 helicopter although this was not evaluated.
- g) During installation the top section of the main pole bent approximately 3 feet from the top.
- h) The bridle and ridge ropes frayed and were replaced with nylon rope.

## 8. FINDINGS

- a. It was found that, with minor revisions, the method of erecting and striking the maintenance shelter as proposed was adequate and practical.
- b. In a sandy loam or clay soil, with light wind conditions, 6 men could erect and strike the shelter in 30 minutes. With less favorable soil conditions and/or stronger winds, additional manpower and time were required. In gusty winds to 20 knots, 12 men were required to erect the shelter.

- c. In a hard, rocky soil the time required to emplace the tiedown pins or stakes normally was one hour.
- d. The issue tiedown pins were inadequate in rocky soil.
- e. The shelter did not provide protection from blowing sand, rain, or dust.
- f. The shelter did provide protection from direct sun and insects.
- g. The shelter was not large enough to completely enclose the UH-1 helicopter and required that the helicopter be moved to perform a complete inspection.
- h. The mosquito netting was not strong enough to withstand the frequent blasts from helicopter rotor downwash.
- i. The durability of the bridle and ridge rope was inadequate.
- j. There was no method to close the ends of the shelter other than the mosquito netting.
- k. The top section of the support pole bent during installation.
- l. A flooring was required when the shelter was erected on soft sand to facilitate movement of the helicopters in and out of the shelter.
- m. The shelter, although not transported by UH-1 in the RVN, could be accommodated in the UH-1.
- n. The shelter did not provide an adequate year around aircraft maintenance facility in the RVN.

#### 9. CONCLUSION

The shelter, utility, tropical, developed by the USAIWL does not satisfy the requirement for an air transportable aircraft maintenance shelter in the RVN.

#### 10. RECOMMENDATIONS

- a. It is recommended that the development of the USAIWL shelter, utility, tropical, be terminated.

b. Alternative approaches should be explored to provide an adequate air transportable aircraft maintenance shelter.

1 Incl  
Distribution

*Hugh E. Quigley*  
HUGH E. QUIGLEY  
Colonel, Armor  
Chief

## DISTRIBUTION

### Department of Defense

Director of Defense Research and Engineering, Department of Defense	1
Advanced Research Project Agency, Office of the Secretary of Defense	1
Chief, ARPA R&D Field Unit, Vietnam	2
Chief, ARPA R&D Field Unit, Thailand	1
Defense Documentation Center	20

### Joint Chiefs of Staff

Chairman, Joint Chiefs of Staff, ATTN: Special Asst for Counterinsurgency and Special Activities, Department of Defense	1
---	---

### Unified and Joint Commands, MAAGS, Missions

Commander-in-Chief, Pacific	2
Commander-in-Chief, US Strike Command	1
Commander, US Military Assistance Command, Vietnam (For J-1, J-2, J-3, J-4, J-5)	5
Chief, Joint US Military Advisory Group to Thailand	1
Commander-in-Chief US Southern Command	1
Director, Joint Research and Test Activity (For Distribution to COMUSMACV and CINCPAC)	6

### United States Army

Chief of Staff, Department of the Army	1
Office of the Chief of Staff, Department of the Army, ATTN: Special Assistant for Special Warfare Activities	1
Office of the Chief of Staff, Department of the Army, ATTN: Director of Coordination and Analysis, Coordination Division	2
Deputy Chief of Staff for Logistics, Department of the Army	2
Deputy Chief of Staff for Military Operations, Department of the Army	5
Assistant Chief of Staff for Force Development, Department of the Army	10
Office of the Assistant Chief of Staff for Force Development, Department of the Army, ATTN: ACTIV Liaison Officer	10

Incl 1